JTRS

JOINT TACTICAL RADIO SYSTEM

- DELIVERING INTEROPERABILITY AND ENHANCED COMMUNICATIONS CAPABILITIES
- TRANSFORMING JOINT WARFIGHTER COMMUNICATIONS
- ENABLING INFORMATION SUPERIORITY

Conquering Communications Challenges Through Software-Powered Interoperability

Current tactical communications systems have evolved to meet service-specific and combat-specific requirements. The tradeoff for specialized functionality resulted in major limitations in communicating from one system platform to another, due to inflexible radio-specific design.

In today's defense environment, current information and effective communications among joint forces are critical. Thanks to the inherent reprogrammability and flexibility of JTRS, radio systems can become the means of integrating and advancing joint communications capabilities.

Joint Vision 2020 envisions increased combat power through **information superiority**. JTRS will enable development and fielding of a **fully integrated information system** that can be **dynamically configured** to enable information superiority.

The JTRS program is dedicated to creating a digital, programmable, modular communications system that supports the need to share real-time information among joint warfighters. When fielded, JTRS will provide network connectivity across the radio frequency spectrum, providing information transfer capability that cuts across all domains of warfare – land, air, and maritime.
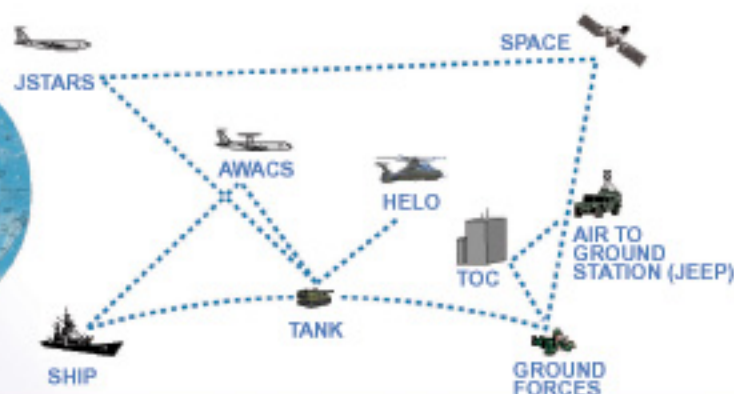
THE VISION:

Seamless, real-time communications among warfighters – through voice, data, and video – within and across the U.S. military services, and with coalition forces and allies.

THE PROMISE OF JTRS

Battlefield Success Powered through Information Superiority
Transforming Today's Internet ... Into Tomorrow's Combat Communication Net

JTRS focuses on capabilities rather than specific hardware. JTRS is more than a family of radios; it is a standardized, integrated approach to wireless communications via radio. Interoperability rests on JTRS' capacity to communicate with current tactical communications systems during the near term phase … and JTRS' ability to provide integrated information sharing in the future through new waveforms to optimally support joint operations. This interoperability will help meet the demands of joint tactical, intelligence, logistics and medical activities that assure combatant effectiveness and safety.

JTRS systems will be interoperable at every level required to effectively support joint operations by:

- Adhering to a common Software Communications Architecture (SCA),
- Using common software applications and waveforms,
- Utilizing standard security procedures and algorithms, and
- Undergoing thorough testing and certification.

Increased Communications Capabilities: JTRS will provide simultaneous, real-time access to multiple channels of information – allowing a warfighter to access maps and other visual data, communicate with a command post, coordinate with allies, and obtain information directly from sensors in a network centric warfare environment.

- JTRS will provide protocol conversion and message format translation to bridge between systems using dissimilar protocols.
- JTRS will provide the ability to retransmit/cross-band information between frequency bands/waveforms supported. This enables JTRS to connect with non-interoperable legacy networks.
- JTRS systems will be able to operate on multiple full and/or half-duplex channels simultaneously.
- JTRS will provide scaleable networking services for connected radio frequency (RF) networks, host networks and hybrid networks.
- Digital waveform emulation will allow simultaneous translation among multiple RF systems and networks – and can bridge between terrestrial RF, fiber-optic, cable and/or wire systems and airborne or space-based telecommunications systems.

Ease of adaptation: Warfighters will be able to add functionality and adopt multiple waveforms quickly and easily through wireless software downloads. JTRS radios will also support multiple security keys, and network services such as ad hoc networking, dynamic routing, self-organization and self-management.

Ease of maintenance: In many cases, a single JTRS radio with multiple waveforms can replace many separate tactical radios, simplifying maintenance. Because JTRS radios are software reprogrammable, they will also provide a longer functional life (reduced obsolescence).
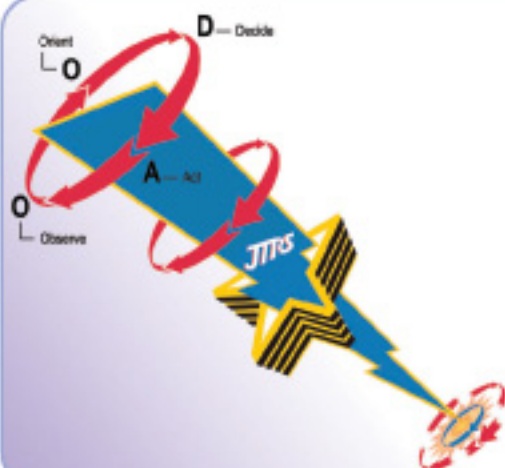
ACT BEFORE THE ENEMY CAN DECIDE

Efficient access to current information allows warfighters to make decisions faster than the enemy. JTRS' interoperability gives joint commands the edge to share critical data, make decisions efficiently, and act swiftly. JTRS' communications capabilities will enable near real-time access to multiple information sources – for all joint combatants. The result: information superiority that dramatically streamlines the decision cycle.

JTRS From a Technical Perspective

JTRS will achieve communications integration and compatibility (interoperability) thanks to several technological factors: utilization of software defined radios; development of a Software Communications Architecture; creation of software applications and waveforms that function consistently across platforms; and a rigorous testing and certification program.

Software Defined Radio: In a software defined radio system functional capabilities are provided through software, rather than hardware. Because JTRS comprises software defined radios, obsolescence is avoided through technology insertion via software changes. JTRS enables radio capabilities to be upgraded without changing the architecture. As a result, functional updates and enhancements can be achieved very quickly and efficiently, even in battlefield conditions. Example: A battalion's worth of JTRS radios could be reconfigured and reprogrammed within 15 minutes, through software downloads, ensuring that the battalion could fully communicate within the joint communications network established for the operation.

Software Communications Architecture (SCA): A common operating environment, the SCA provides a framework for developing software applications that can operate effectively on different JTRS hardware platforms. The SCA achieves this independence of hardware and software by specifying a common operating environment (Core Framework) to be run on every platform. The SCA also specifies waveform interfaces that are compatible with the Core Framework. This open architecture facilitates expansion and growth. Therefore, waveform software can be written once and run on multiple platforms. Example: Communications software applications and security algorithms will be able to function consistently on any JTRS radio box — whether a handheld mobile unit, a large stationary radio at a command center, a shipboard unit, or an aviation radio.

Software Applications and Waveforms: Waveform applications are software that determine the total functionality of the radio, from the user perspective. Some waveforms will provide functionality that is compatible with currently fielded tactical radios, in order to provide cross-system communications until JTRS radios are universally fielded. Other waveforms, such as the Wideband Networking Waveform, will provide entirely new communications capabilities for all JTRS radios.

A waveform will provide interoperability (in terms of frequency, bandwidth, and mode) from one JTRS radio to another. It will also provide consistent, compatible communications across JTRS clusters. Not only will an operator be able to select a specific communication modality provided by the waveform – but the user interface will be consistent from platform to platform and from cluster to cluster – minimizing the need for operator and support training.

Testing and Certification: The JTRS Technology Laboratory (JTeL), along with the Joint Interoperability Test Command (JITC), and the National Security Agency (NSA), will:

- Verify the compliance of each JTRS waveform and application with the SCA,
- Verify the compliance of each Core Framework (operating environment) with the SCA,
- Validate the functionality and accuracy of each waveform,
- Verify compliance of each waveform with security requirements,
- Assure the portability of each JTRS waveform across JTRS platforms, and
- Assure the interoperability of JTRS legacy waveforms.

> **JTRS will carry real-time information the "last tactical mile" to the warfighter in the field. Ultimately, JTRS will enable greater success and safety for joint warfighters through cross-echelon communications. With effective implementation, engagements will be won more quickly ... *lives will be saved.***

JTRS at the Program Level

The JTRS Joint Program Office (JPO) is the central coordinating and support organization for the program, with management oversight from the Under Secretary of Defense for Acquisition, Logistics and Technology (USD ALT); Assistant Secretary of Defense for Networks and Information Integration (ASD NII); and the Department of the Army.

Through JPO, JTRS' sponsors, the services, JTRS' partners, and industry, the program is:
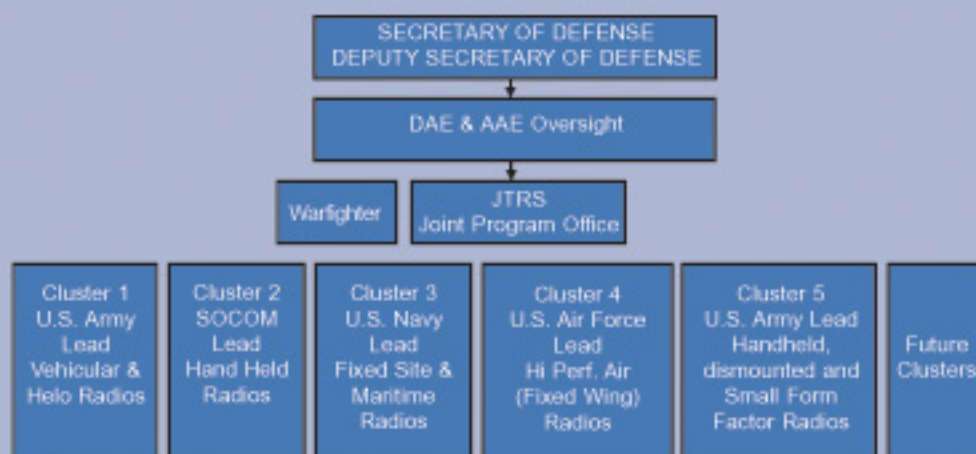
- Developing technology strategy;
- Formulating, testing and implementing technical solutions;
- Providing a joint procurement mechanism;
- Maintaining a joint migration strategy, concept of operations, and strategic plan to help guide and streamline JTRS acquisition and mission oriented fielding; and
- Developing and maintaining architecture, waveforms, and crypto algorithms.

JTRS has embraced an innovative procurement approach to give industry the flexibility and incentives to innovate and advance the technology, within the framework of an open architecture envisioned and developed to be an international standard. Industry teams are uniting to develop the specific technical solutions required to meet the communications requirements of each JTRS functional cluster.

JOINT TACTICAL RADIO SYSTEM (JTRS) PROGRAM:

The Joint Tactical Radio System is a DoD initiative. JTRS is designed to provide a flexible new approach to meet diverse warfighter communications needs through software programmable radio technology. Service requirements are "clustered" so that similar requirements can be met with a single acquisition effort. The lead service for each acquisition serves as the Cluster manager.

HOW JTRS IS ORGANIZED

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SECRETARY OF DEFENSE
DEPUTY SECRETARY OF DEFENSE
            |
    DAE & AAE Oversight
            |
Warfighter      JTRS
            Joint Program Office
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| Cluster 1 U.S. Army Lead Vehicular & Helo Radios | Cluster 2 SOCOM Lead Hand Held Radios | Cluster 3 U.S. Navy Lead Fixed Site & Maritime Radios | Cluster 4 U.S. Air Force Lead Hi Perf. Air (Fixed Wing) Radios | Cluster 5 U.S. Army Lead Handheld, dismounted and Small Form Factor Radios | Future Clusters |

JTRS' Technology Strategy – Implications Beyond the Battlefield

The JTRS technological approach holds great potential and promise beyond the military arena. Other potential applications include areas such as:

- homeland security;
- federal, state and local law enforcement;
- disaster recovery;
- search and rescue;
- commercial aviation; and
- international commercial usage.

In the near future, the technology will also be used in applications such as radar, sonar and space communications systems. The potential public benefits of JTRS are immense in terms of greater national security and safety. As JTRS standards and technical approaches are adopted commercially, the technology can yield better service, greater operational efficiency, and the potential for cost savings across many industry segments.

JTRS: 2001 Recipient of the DoD Defense Standardization Program Award

The Defense Standardization Program Awards honor personnel and organizations for outstanding performance in implementation of the Defense Standardization Program. The JTRS JPO team was recognized for its achievement in developing the standardized Software Communications Architecture (SCA) in only 3 years from solicitation to release. The SCA will be used in all future DoD tactical radio designs, and is being promoted as an international commercial standard.